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# SCIENTIFIC METHODS OF CAPITAL PUNISHMENT.

BY

J. MOUNT BLEYER, M.D.

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# SCIENTIFIC METHODS OF CAPITAL PUNISHMENT.

By J. MOUNT BLEYER, M.D.



## I. GENERAL REVIEW OF THE SUBJECT.

THE subject of Capital Punishment, and of devising means for rendering the infliction of the death penalty less offensive to the humane sentiments of the age, is deservedly receiving a good deal of attention, and in one State, that of New York, while I write, a public commission is investigating the several methods proposed by physicians, scientists, and others for carrying out capital executions "decently and in order,"—swiftly, surely, and *humanely*. The present essay is prepared in response to the invitation sent out to physicians by the New York State Commission on Capital Punishment.

The taking of human life by process of law has ever been regarded as a necessary exercise of the right of self-defence naturally vested in society, and an indispensable means of providing for the security and well-being of all its members: nevertheless there has arisen in recent times a strong feeling of opposition to the theory and practice of legal retaliation, as far as the death penalty is concerned, and in particular against the bungling and

barbarous method of capital execution in use from time immemorial in England, and thence derived to America—death by strangulation, or by hanging. Moved by such considerations as these, some of the States of the American Union, as well as one at least of the governments of Europe, Switzerland, some years ago enacted laws abolishing the death penalty, but I believe that all, or nearly all of these States have since repealed such legislation, on the ground that, in the absence of the supreme penalty, the class of crimes known as "capital" was found to increase in a marked degree. But our present concern is not with the question of the retention or the abolition of the death penalty in general: we have to do only with the problem of devising a substitute for the gallows as a means of carrying out capital executions. Nor do we intend to consider any of the methods of capital execution in vogue in countries where the rope is not employed—as the guillotine, the garrote, shooting to death, etc.,—but only to propose other methods, suggested by the advance of physical and chemical science in modern times. For the rest, judging from the frequen-



cy of murderous crimes shown by criminal statistics from year to year, and by the records of the newspaper press, we find little reason to infer that the number of human beings to be done to death according to law will be in any notable degree diminished in the near future.

## II. DEATH BY HANGING.

IN view of this condition of affairs, it behooves the medical profession, which, more than any other class, has knowledge of the processes of living and of dying, to consider the means adopted by the legal authorities for taking lives which have been forfeited to the State; to decide whether or not these methods are humane; and to advise the law-makers concerning improvements, if any are necessary and possible. I write in the full conviction that the present usage is antiquated and barbarous, and that a substitute for it can readily be found which shall be free from objectionable features.

It is not my purpose to attempt an historical account of execution by hanging. Suffice it to say that it has long been the favorite method of putting criminals to death in the English-speaking countries, and was doubtless adopted on account of its supposed superiority to others in point of humanity. That death by hanging is sometimes sudden, painless, and as free from hideous display as such a process well can be, is freely admitted; but that it is often slow, painful, and altogether horrible, is known to all men. Occasionally the rope breaks, and the victim falls to the ground, only to be picked up and dragged again to

the scaffold, to experience once more the bitterness of death. Once in a while the long drop effects decapitation, and we have the bloodiness of the guillotine, without its grim decorousness.

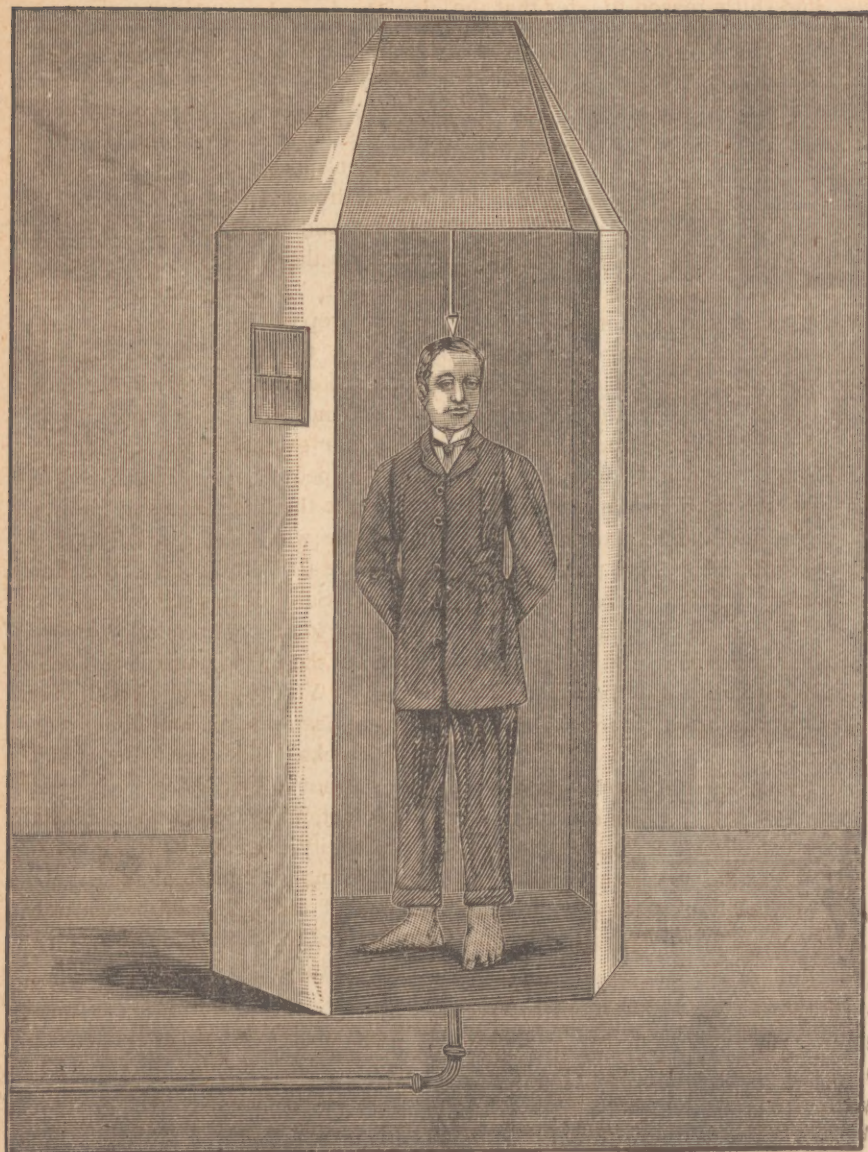
Last winter in England a condemned man was on the scaffold: the last word had been spoken, the bolt was drawn, but the drop did not fall. The convict was removed, the apparatus was tested, and again the intended victim was put in position. A second and a third time did the drop fail to act when released, and then the poor fellow, who had thrice looked death calmly in the face, fainted and was carried back to his cell. His sentence was commuted, and the people said Amen. So frequent are the bunglings and failures, that those who have the business in charge are always nervous till the affair is over. Said the assistant-warden, in response to a congratulation on the success of the recent hanging at Thomaston: "Yes, it passed off well; but we have been very anxious about it for three weeks. The last one we had here was not so successful!" Indeed it was not, as any one who witnessed it can testify. I have no hesitancy in pronouncing so imperfect and cruel a method of taking human life entirely unworthy of the civilization of the nineteenth century.

## III. DEATH BY ELECTRICITY.

Last April in the Legislature of Pennsylvania a bill was introduced providing that the penalty for the crime of murder in the first degree should be death by electricity.

This method of taking human life certainly possesses all the requisites





CAPITAL EXECUTION BY ELECTRICITY.



of a fitting mode of capital execution: It is decorous, involving no brutal or barbarous intervention of the executioner; it is humane, involving no prolonged agony for the condemned. The duration of an electric spark amounts only to an extremely small fraction of a second of time—about one five-hundredth part. The nervous system requires an appreciable length of time to act or to react. A puncture made with a pin on the arm is not *instantly* noted by the brain, or felt, as we say; a man may lose a finger or a hand by the action of a rapidly revolving circular saw, and feel no pain at the instant. In death by the electric current life is undoubtedly extinct before the afferent nerves can carry to the brain intelligence of the stroke that has fallen. It follows that death by such means—death by electricity—must be absolutely painless.

The mode of execution by electricity would be about as follows:

Electric wires connecting with the main wires which supply light through the city's streets, might be laid to the place assigned for executions, being so concealed and guarded as to be inaccessible to the condemned criminal or his friends, and otherwise protected against accident. At the assigned place a small wooden house, like a sentry-box or a watchman's hut, should be erected. A metallic plate connecting with one of the wires and serving as an electrode is placed even with the floor of the hut; on this plate the criminal is to stand. A second electrode is introduced through the roof of the hut, and its end descends just so far within the hut as just to touch the top of the

head when the criminal is introduced into the box. His feet should be bare, and his hair cropped short. When the time for the execution has come, the electrodes are to be tested to determine whether the current flows in sufficient force, and the whole apparatus is in proper working order. If so, the sheriff, or his deputy, or other representative of the law, touches a push-button, thus closing the circuit. The electric current passes through the body of the criminal, and even before the bystanders have consciousness of the act of pressing the button all is over.

Post-mortem examinations show the blood coagulated throughout all its vessels. Experiments made by me upon the lower animals prove that after death by electricity decomposition proceeds with extreme rapidity. Perhaps this circumstance is to be regarded as an incidental advantage of this mode of execution: it would tend to abridge, if not to abolish, the customary "wake" of the criminal's carcass.

#### IV. DEATH BY MORPHINE INJECTION.

Equally painless is death by the hypodermic injection of morphine; and in other respects this method of destroying life seems to be eminently suitable to be employed in capital executions.

But what is Morphine? It is a substance derived from opium, and opium itself is the inspissated juice of the unripe capsules of the white poppy. Incisions are made in the capsules with a small sharp knife, and twenty-four hours afterward the product of exudation is scraped off and collected. Opium is produced





HYPODERMIC INJECTION OF MORPHINE.



in various parts of the world, chiefly in Turkey, Asia Minor, Persia, and India. It is a very complex body, containing many other alkaloids besides morphine. Morphine occurs in the form of colorless, shining feathery crystals. The dose for an adult person is from one-eighth to one-sixth

of a grain.

Hypodermic, or Subcutaneous Injection is a simple method of introducing into the circulation certain drugs, especially anodynes: it is frequently resorted to, by surgeons in cases where a more prompt and decided effect is desired than could be obtained by introducing the same medicinal agents through the mouth.

It was Professor Rudolph Virchow of Berlin who first absolutely demonstrated the incapacity of the human stomach to absorb the heroic doses of medicine prescribed by the physicians of the olden time. At

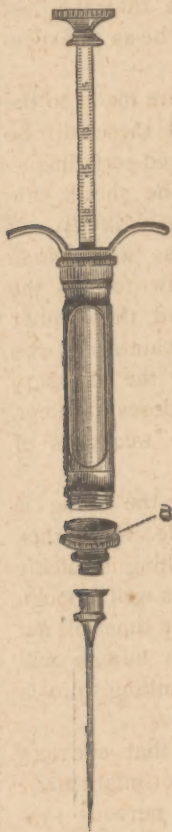
present the microscopic chemist knows that certain medicines are never thoroughly absorbed by the human stomach, the ultimate molecules of these agents being too large to enter the minute absorbent vessels distributed over the stomach walls. Accordingly the preparation of medicines has undergone a vast change in our day, and now in most cases only

their active principles are used. They are so perfectly manufactured that they readily pass from the stomach into the current of the blood circulation: or they are introduced under the skin by the hypodermic syringe. This instrument is a small syringe holding about thirty drops of liquid, and having for its nozzle a hollow needle. In giving an injection, the operator seizes between the thumb and the first two fingers of his left hand the skin, usually of the subject's arm, and holding the charged syringe firmly in his right, quickly thrusts the needle-point into the superficial under-skin, at the same time forcing the liquid into the puncture. The needle is then withdrawn, and the operation is at an end.

The details of a capital execution by morphine injection would be about as follows: \*

At the appointed time, the sheriff, accompanied by two deputies and the citizens prescribed by statute, enters the cell of the convict, who is lying on a couch. The sheriff administers six grains of sulphate of morphine under the skin of the felon, who, in a few moments begins to be drowsy. Soon he is overpowered with sleep, and the officer, to make assurance doubly secure, repeats the dose. Within half an hour the heart has ceased to beat, and the man is dead, having passed away without pain, convulsion, struggle, or consciousness.

The advantages of this method are its certainty, its painlessness, the freedom from the chance of horrible



\* The engraving shows the method of administering morphine by hypodermic injection.



displays, the reduction of the dramatic element to a minimum, and its inexpensiveness.

(1) No one will dispute the certainty of the result. If anybody fear that the dose is too small, it can be repeated over and over again, so that the end may be greatly hastened. There is no possibility of the rejection of the poison.

(2) No suffering is caused to the condemned man, for the slight sting of the hypodermic injection is unworthy to be called pain.

(3) There are no convulsions, no decapitation, none of the hideous phenomena that often attend a hanging; the man simply goes to sleep, never to awake.

(4) Many of the criminals who are condemned to death, finding that a change of punishment is impossible, make the most of their situation, and try to glorify themselves in the eyes of their friends by "dying game" on the gallows, and carrying themselves jauntily on the threshold of eternity. The exclusion of the public from executions has greatly diminished the opportunities for spectacular display; but the quiet and seclusion of the cell in which the fatal dose of morphine is taken reduces these chances to their very lowest terms. A villain on the scaffold, in full possession of his faculties, anticipating instant extinction, may appear heroic; the same man submitting to the trivial puncture of a hypodermic needle, and presently becoming too stupid to keep his eyes open, is far less likely to consider himself, or be thought by others, a hero.

(5) The cost of erecting the gallows is considerable; that of a hypo-

dermic syringe and morphine insignificant. It may be a small matter to discuss; but, after the State has been at the expense which a murder-trial usually costs, generally paying the fees of the defendant's counsel, as well as those of the prosecution, it is not improper to desire that the last act of the tragedy may be as inexpensive as possible.

Various objections are made to the proposed change, and these will be considered and answered seriatim.

(a) It is said that the sheriff cannot inject the morphine skillfully. If one but recalls the ease with which he himself learned how to use the hypodermic syringe, and the number of people in his acquaintance who acquired all too readily the necessary skill for administering doses to themselves, he will see the weakness of this objection.

(b) The slowness of the dying is thought to be undesirable. But in this, as in other affairs, the thing is quickly enough done, when it is well enough done. At the worst, the time will not be very long, and every minute will show that the man is sinking into a rapidly deepening sleep.

(c) It is suggested that convicts might be opium-eaters, or might train themselves so that their nervous systems would be incapable of receiving a fatal impression from morphine. To say nothing of the supposition that any person might not be poisoned to death by morphine, it is to be observed that the law requires that a considerable interval of time shall intervene between sentence and execution, and surely the State does not supply its prisoners with drugs to be taken for merely intoxicant effects. At all events



the opium-habit would be cured, or its slave be dead,—an arrangement to which nobody would object.

#### V. DEATH BY CHLOROFORM.

The anæsthetic which has hitherto been most largely used in medical and surgical practice is Chloroform, and this agent may cause death when introduced into the system by inhalation.

Chloroform is a colorless, heavy volatile liquid, having a fruity, ethereal odor, and a sweet, pungent taste. It is formed by the union of chlorine and marsh-gas, but more commonly by the action of bleaching powder on ethylic or methylic alcohol.

The symptoms produced by the inhalation of chloroform vapor may be divided into three groups of varying intensity. Briefly they are as follows:—

*First*, a degree of relief from pain (if the subject has been suffering pain) with slight stimulation, the senses being but slightly affected.

*Secondly*, a stage of excitation and incoherence, wherein the subject is prone to struggle.

*Thirdly*, a stage whereof the most marked features are complete insensibility and narcotism, with relaxation of the muscular system. At first there is consciousness of all that is passing about the patient or subject; there is however dizziness and ringing in the ears. Then the mental faculties are impaired; there is often excitement; the saliva is increased; the inhaler is pushed away; rigidity and spasms of the muscles may occur; and there is incoherent talk.

In the next stage there is insensibility to pain, and the eyeball may be

touched without causing flinching. If the use of the anæsthetic be pushed further, the breathing becomes stertorous, the muscles quite relaxed, and the pupils dilated; while a still further increase of the chloroform embarrasses and then stops the respiration, and arrests the heart's action.

Many cases of death from the vapor of chloroform have occurred, the fatal result sometimes happening very rapidly, from shock, syncope, or convulsions: in others again by way of asphyxia. The vapor of only 30 drops of chloroform has destroyed life in one minute.

Should Chloroform be employed for inflicting the legal death penalty, the selection of the apparatus would depend upon circumstances, and on the judgment and the experience of the administrator of the drug. Whilst elaborately contrived inhalers are used in hospitals, none of these would be required in capital executions, the purpose of their contrivers being to render the administration of the drug as safe as possible. It suffices to bind over the mouth and nostrils of the subject a cloth saturated with a sufficient quantity of the chloroform. The subject should be placed in a reclining posture. As insensibility is more rapidly produced by this agent when the stomach is empty, no solid food should be given for at least six hours before the administration of the drug.

#### VI. DEATH BY PRUSSIC ACID.

Hydrocyanic, or Prussic Acid, on account of its energetic, and rapid action, is one of the most formidable poisons known. In its concentrated state it is a limpid, colorless liquid,



having a somewhat acrid taste, and its odor, when diffused through the air, is like that of bitter almonds.

On being introduced into the system it rapidly enters the tissues, and acts chiefly on the nervous structures. Taken in a considerable dose it causes giddiness, faintness, and nausea, a feeling of constriction in the chest, headache, mental confusion, disordered breathing, slowing of the pulse and muscular debility. Larger doses aggravate these symptoms, and produce grave dyspnœa and other signs of asphyxia. Taken in still greater quantity it produces death swiftly. Analysis proves that this agent while depressing all the nerve tissues, acts first and chiefly upon the respiratory centers, which are momentarily excited and then depressed; there is weak respiration with long pauses, dyspnœa, convulsions, and finally death by asphyxia.

#### VII. OBJECTIONS CONSIDERED.

1. It is objected that the publicity of an execution is diminished by the projected methods, and the chance to impress the people is lost. The present law allows but few to attend an execution, evidently with the design of avoiding publicity, for the effect on the community of an old-fashioned hanging was believed to be extremely harmful. A sufficient impression is made on the populace by the announcement of the fulfilment of the law; the chief purpose of which is the permanent removal of a worse than worthless member of society.

2. Some have said that they do not object to having felons endure some physical pain. Obviously the

people do not entertain such views; for they have abolished torture and those forms of execution which are always painful, like crucifixion; and I believe they have retained hanging so long only because no plainly better plan has been advocated. The effort always is to make the death by hanging as sudden and painless as possible; and, when it is not so, we blame the executioner.

3. It is objected that criminals dread death by hanging more than they would that by electricity, morphine, etc., and thus are deterred from committing deeds which they would venture upon, if an easy poison or the electric current were substituted for the rope. This seems to me in the highest degree improbable; but the discussion of the point would inevitably lead to the re-opening of the question of the value of capital punishment, a subject which it would be improper to introduce here. It is well, however, to remember that the deprivation of opportunity for a dramatic exhibition would be so serious a matter to a convict that it would be almost like adding a sting to death.

#### THE INFLICTION OF THE DEATH PENALTY.\*

BY PARK BENJAMIN.

By legislative enactment, the State of New York last year established a commission charged with inquiry into the expediency of substituting a different mode of inflicting the death

\* Reprinted by permission of the Editor of "The Forum," the new American review, in which it was published last July.



penalty for that now sanctioned by law. The commission has not yet reported, and will not, probably, for another year. It has, however, sent forth numerous circulars of inquiry, and is in receipt of many replies. While it has by no means gathered all desirable information, and hence is not yet in a position to determine certainly as to the preponderance of opinion, much less to reach definite conclusions, it is understood that a rough generalization of the replies shows, first, that the advocates of retaining the present mode of execution and the advocates of a substitute therefor are about equally divided in numbers; and, second, that of those who desire a different method of execution, a decided majority favor the employment of electricity as the best means of destruction.

It is to be hoped that hereafter, either in the report of the commission or through some other public medium of information, a careful analysis of the reasons of the various writers will be presented; and especially is this to be desired if, after all data thought necessary have been accumulated and digested, the plurality of advocates shall still be found adhering to the existing method. Such an analysis cannot fail to be highly instructive and interesting, and to none more so than to those—and with them, be it said at the outset, the present writer is to be classed—who are disposed to hesitate in according to the adherents of the gallows any more credit than that which attaches to over-cautious conservatism.

In making such an analysis, the fundamental requirement will be, it is thought, a complete separation of

reasons which, for want of a better term, may be generically classed as sentimental, from those which are based on strict and proper considerations of public policy and scientific fact and deduction. For example, it may be a question of public policy whether or not a mode of death carries with it the idea of such great personal degradation ("to be hanged like a dog") as to render its retention expedient despite all possible objections. It is a question of physical science whether or not hanging is a speedy and certain mode of destruction. But it is neither a question of public policy nor of physical science, but one of pure sentiment, whether any particular procedure is or is not more disagreeable, mentally or physically, to the criminal than some other lethal operation. The moment we consider any other effect than speedy death of the condemned we introduce a factor which has no proper place in determining the problem, and which ultimately will surely lead us far astray from any true solution.

The analysis previously mentioned should show how far, if at all, such considerations have influenced conclusions; and by just so much as they shall be found to control the final adjudication depending on these conclusions, to that extent it is believed the result will be based on faulty and erroneous premises. The sole condition is, an animate being to be deprived of life. The problems are, first, what is the simplest, surest, and most expeditious way of accomplishment; second, inasmuch as the being is human and inasmuch as by destroying him a settled definite purpose is to be effected, which of the various



ways of causing death will subserve that purpose best. This is essentially all there is of the matter. All the dread solemnity inherent in the ghastly proceeding, all the pressing and vital considerations dictated by religious faith, all outpouring of the human sympathy which even the most abandoned of wretches seems to find in the very shadow of the beam: all of that, hard as it is to separate it in our minds from its intimate connection with forcible dissolution, must, nevertheless be put out of sight. We have to do with a cold question of physical and political science; nothing more, nothing less.

There are certain generic considerations, almost axiomatic, concerning the death penalty, which, if recalled, may aid us in perceiving that the issue is really thus narrowed. The State assumes the right to decide that in certain prescribed circumstances one of its members shall suffer death: this, not because of the self-evident proposition that the person so destroyed is thus rendered incapable of further misdeeds, but because, with his fate as an example, other persons prone to like wrong-doing presumably will be led to forego its perpetration. When the supreme penalty is attached as the sequel of certain events, the manner of its infliction has no logical relation whatever to the character of any circumstance which forms a link in the chain of cause and effect of which it is the termination. Yet there is no error more deeply rooted than that a peculiarly atrocious crime should be expiated by some peculiarly horrible death. No better illustration of this mistaken notion could probably be found than is af-

forded by the following extract from an editorial which recently appeared in a leading journal of Brooklyn, commenting upon a singularly revolting case of wife-murder:

"Immured in a dark and silent cell in the Tombs, he ought to be kept in ignorance of the hour of his execution until the visit of a clergyman gives him some warning that his doom draws near. No other human being should be allowed either to see him or to know that he is yet unchanged. No death-watch save that of a denunciatory conscience, no recreation beyond his own thought, no hope save that of an immortality of remorse, should be given him. Let him hear at the last moment, when standing on the fatal trap, his death warrant read by a single man (*sic*), who, with his assistants, should be masked, that the miserable privilege of seeing a human face once more in this world might be denied him. Let the body be cut down and secretly incinerated. Let the ashes of such a despicable existence be scattered to the four winds, that nature may perchance in time adapt them to higher forms of assimilation. No spot of earth should be desecrated by the memory of the wife-butcher. The sentence of the tribunal of retributive justice should be organic and, as far as possible, inorganic extinction."

One might expect such an outburst from a Jeffreys or a Scroggs, gloating over its effect upon some trembling wretch; but surely not from an enlightened guide of public opinion in the present year of grace. For all misdeeds not punishable by death, it is, of course, not only logically correct but necessary, to meet specific crimes by specific penalties varying both in character and degree; and there are well-known instances where unusual punishments have proved the only efficacious ones in stamping out seeming epidemics of particular offenses. The practice of garroting, in England, for instance, is said to have speedily decreased when the lash followed con-



viction. But while the mode of exercise of man's power over man can be graduated in countless ways, it reaches its limit in the deprivation of life. Its result cannot be augmented or diminished by anything additional done either before or after the final act. We do not dot the New Jersey meadows with malefactors hanged in chains, nor expose the heads of criminals on pikes along Broadway, after the fashion of our ancestors; yet it would be no more absurd, logically, for us to maintain the propriety of resuming these or kindred practices, than it is to assume that there can be anything commensurate between the degree of atrocity of a crime upon which the death penalty is attendant, and the peculiar mode chosen of inflicting that penalty.

Allusion has already been made to the popular notion that hanging *per se* is an exceedingly ignominious death. But if a man commits suicide by hanging himself, we do not conclude that he thus incurs any more disgrace than if he had chosen some other mode of accomplishing his exit from the world. It is, therefore, difficult to perceive wherein being hanged is more odious than being shot or being drowned. The fact is, and it is this which is overlooked, that the disgrace attaches not to the legal consequence of the offense but to the offense itself. Its full measure is reached after conviction and sentence. Then the criminal is merely a living thing, holding its life temporarily on sufferance, and cognizable only so far as it affects society, and not as society affects it.

At the foundation of errors of this sort lies the assumption that the law is, in some way, an instrument of revenge. In truth, the man-made statute

which decrees that the effect following a given cause shall be death is inherently no more vindictive than the law of nature which makes death the consequence of another cause. The human law says that if a man commits willful murder he shall be put to death. The natural law decrees that if a man gets in the way of a moving locomotive he shall be killed. He is not obliged to murder any more than he is to stand in front of the locomotive. If he do either he simply subjects himself to certain influences which destroy him. The origin of the influences is not material, as affecting the result. There is no more revenge or vindictiveness involved in their exercise in the one case than there is in the other.

But if A sees B killed by a locomotive, the presumption is that A will be exceedingly careful ever after not to get in the path of locomotives. Equally, if A sees B killed by the law, A will be exceedingly careful ever after not to invite destruction through the same agency for himself. The instinct of self-preservation is aroused in both cases, and an invocation of this first law of nature, so long as mankind is constituted as it is, is the most powerful deterrent influence that can be exerted. It is pleasant to believe that men will refrain from murder on moral grounds, but in the long run experience tends to show that where the moral sense is strengthened by the same fear that prevents people from dwelling in the track of avalanches, human life is, on the whole, safer.

If we conclude, therefore, that, in reaching a solution of the problem before us, all ideas of revenge to be gratified or ignominy to be caused must be laid aside as illogical and



irrelevant, we shall find that we have no other question to deal with than that of producing a swift, painless, and certain death, limited by no other condition as to its mode of infliction than, other things being equal, that the method chosen shall be calculated to impress the popular mind with the strongest intimidation.

Hanging does not meet any of these conditions. It is not swift, for it may involve slow strangulation. It is not necessarily painless. It is not certain, in the sense that persons apparently thus killed may not be resuscitated. It is not strongly deterrent. The same journal, in the article already quoted, asserts, as one reason for the physical obliteration which it favors, that "the tragic climax of a public hanging has a heroic aspect, a tincture of martyrdom." All that can safely be said in its favor is that, in comparison with other modes of execution in vogue, it is probably the best—because we have adopted it.

Past experience has conclusively shown that, leaving the constitutional prohibition and the logical absurdity as well as the revolting barbarism involved, entirely out of sight, to make the mode of death more horrible exercises no corresponding preventive effect. People murdered more than they do now, when the penalties included tortures of the most diabolical sort. It is, therefore, useless to dwell upon that view of the matter; so that the proposition reduces itself to a question of whether or not we can find a substitute which shall be preferable to hanging.

Now, executions by hanging date from the time of Haman, and proba-

bly long before. So do wars. And through war and executions we extirpate our race in the only possible lawful manner.' It is an odd fact, however, that while to the improvement of the art of killing our enemies through war we have devoted ingenuity of the highest order, and produced monster guns, dynamite projectiles, armored turrets, iron-clad ships, tremendous explosives, and submarine torpedoes, and thereby have made conflicts between nations so deadly that we may even begin to look forward to the time when they will no longer be waged, for this very reason; yet, toward improving the methods of killing murderers, who are just as much enemies, not merely of the State, but of all humanity, we have done simply nothing. We slaughter bees scientifically, we smother stray dogs in "lethal chambers," we have even resorted to small dynamite cartridges wherewith to blow off the heads of disabled army mules, but when it comes to destroying a criminal, we go back to antiquity and use a rope. Worse still, we do not even perform the revolting work skillfully, but intrust it to bungling and frightened officials, with results which are causing respectable newspapers to expurgate the details from their reports of executions.

The various modes of inflicting the death penalty which have been suggested as substitutes for the gallows, and which are worthy of consideration, are not many in number, and most of them can be dismissed as objectionable in few words. Any proceeding which the subject can physically oppose, or of which he can ward off the deadly effect for a measurable



period of time, is unsuitable. This sets aside suffocation by carbonic acid gas, drowning, and the use of deadly anæsthetics; and, even more certainly, all forms of poisons. The hypodermic injection of poison, which lately has found very many advocates, fails to meet the requirement that death must be caused instantly, and just as rapidly to the strongest as to the weakest individual.

Any proceeding which involves the application of medical or surgical skill to insure its efficiency must likewise be ruled out. The medical faculty presumably will not assume the rôle of executioners. A physician may be called upon, as he is now, to distinguish real from apparent death, after the act is accomplished, but his function should go no further. Even the present practice of holding the pulse of a suspended wretch, or lowering the body to listen to the failing heart, is needless and repulsive. In view of the minute care for the proprieties of medical life exercised by the paternal codes of ethics now in vogue, the toleration of this practice by existing censorships is, to say the least, singular.

Unless surgeons are to be executioners, we, therefore, put aside devices for piercing the medulla, for painlessly dividing vital organs by swiftly revolving blades, and all other mechanical operations of that sort. In fact, it is safe to assume that public sentiment will peremptorily refuse tolerance to any form of bodily mutilation; and in this view even an exceedingly effective and instantaneous destructive agent—a rifle bullet sent through the brain—becomes objectionable, although it is doubtless preferable

to any other means save that now to be noted.

The result is to leave really available but one means, electricity; and that, it is thought, so completely and adequately meets every possible requirement that its ultimate adoption cannot long be delayed. Death caused by a powerful electric current is substantially the same thing as death by lightning stroke. It is instantaneous and painless, for no opportunity is afforded for any sensation to be recognized. In order that the brain may take cognizance of any impression transmitted to it by the nerves, a measurable period of time is required. This Professor Hemholtz estimates at one-tenth of a second, so that if, for example, the finger be pricked with a pin, this interval is required for the sensation to be telegraphed, so to speak, to the brain. If, then, death can be caused in less than one-tenth of a second, it follows, necessarily, that no matter how great the pain otherwise might be, it is impossible for it to be felt. Now, a rifle bullet travels at such a velocity that it will pierce the brain in perhaps one-thousandth of a second, and hence consciousness may be destroyed even by this mode so quickly that the wounded person experiences no sensation. This accounts for the well-known fact that on every battle-field men have been found dead in the most life-like attitudes, such as biting cartridges or ramming home charges, their existence ending before they could make the smallest movement in recognition of the injury.

Professor Tyndall considers that an electric discharge (a flash of lightning) occurs in probably a hundred-thou-

sandth part of a second, and during that inconceivably short period it does its fatal work. He himself came very near to scientific martyrdom, and to proving his own theory as to the deadly velocity of the lightning stroke, by accidentally receiving, in the course of one of his lectures, the combined discharge of some fifteen large Leyden jars. He very graphically describes his sensations in one of his published essays, dwelling on the point that "life was absolutely blotted out for a very sensible interval, without a trace of pain," and concluding that "there cannot be a doubt that, to a person struck dead by lightning, the passage from life to death occurs without consciousness being in the least degree implicated."

Since the introduction of electric lighting, which involves the handling of conductors carrying enormously powerful electrical currents, often by careless or unskilled persons, there has been no lack of fatal accidents; so that the files of the daily journals for the last half a dozen years will furnish abundant proof of the deadly nature of the agent. Quite recently a case was reported of a young man who, from curiosity, visited the dynamo room of an electric lighting station with a party of friends. The bright sparks at the commutators, perhaps, caught his eye; he forgot the warnings everywhere posted, carelessly touched the brushes of the nearest machine, and fell dead. With abundant instances of this sort known, it is needless to devise new ways and means of producing sufficiently deadly electric discharges, for they are generally available wherever electric lighting is in existence. The sole requirement

is that the current shall be strong enough to do the work. There is no necessity of exactly proportioning its strength to meet the specific resistances of individual bodies. All that is required is that it shall be sufficiently powerful to meet any possible condition, and this is easily arranged. M. D'Arsonval has recently reported experimental results which apparently show that so long as the current has a pressure so low as not to produce with certainty an anatomical lesion—and such a pressure he estimates as one due to a difference of potentials of less than 500 volts in a continuous current—artificial respiration may result in bringing the subject back to life. But, when the current has sufficient pressure to disorganize the tissues, then resuscitation, he says, is impossible. As currents of very much higher pressure than 500 volts are frequently used in electric lighting systems, and discharges at immense pressure are easily secured through the use of induction coils, there is no practical difficulty in the way of obtaining electric shocks which shall be infallibly fatal.

The practical details of an electrical execution might be very simple. It has been suggested, in order to insure passage of the current through the most vital organs, to dispose the terminals of the conductors (which last might be simply branches from existing electric light wires) so that the discharge may traverse the entire body. To this end, one electrode might be placed in contact with the base of the brain, and the other take the form of a moist plate of metal, on which the condemned might stand, the feet being bare. The circuit being normally



open, it would simply remain to close it by the pressure of a button or key, and so allow the current to pass. Even the necessity of human interposition to do this last act could be obviated by arranging a simple contact device controlled by a clock, which at the appointed instant would automatically establish the circuit, and thus render the last vestige of the executioner's work a thing of the past.

As to the deterrent influence of this form of execution upon the lawless classes, it is believed that no other mode of inflicting death could inspire stronger fear. Even those accustomed to deal with electricity every day of their lives cannot divest themselves of an undefined impression of mystery which seems to surround the form of energy of the very nature of which all men are ignorant. The lack of popular knowledge of even the most elementary electrical laws is remarkable, and this deficiency is by no means confined to the illiterate masses. People still attribute to electricity almost every out-of-the-way natural phenomenon which they cannot understand, as much as they did a hundred years ago. Electro-biology, odic force, psychic force, mesmerism, and all the other shadowy theories based on odd psychical or physical manifestations or coincidences, are ascribed to electricity as freely to-day as they were before Franklin, Lavoisier, Bailly, Guillotin, and the remainder of that famous committee administered their crushing blow to Mesmer's electrical pretensions. No

death is more dreaded than that which is mysterious. "Died by a visitation of Providence," we say, when the mystery cannot be fathomed. The swift obliteration of life following certain failures of vital organs causes the utmost apprehension. We add to the litany a prayer for deliverance from "sudden" death. From the very earliest ages, superstitions of almost every conceivable form and character have clustered about the lightning stroke, and many of them still survive. It is not difficult to conceive that the instant extinction of life in a strong man by an agency which it is impossible to see, which is unknown, may create in the ignorant mind feelings of the deepest awe and horror, and prove the most formidable of all means for preventing crime.

If there be any valid objections to the use of electricity for the purposes of execution, it is to be hoped that the advocates of the rope will make them public. The only opposing argument which the writer has encountered, excepting such as are based upon mistaken notions as to the necessity for some painful or supposedly ignominious form of death, was not long since advanced by an electrical journal, which objected on sentimental grounds to electricity being thus discredibly utilized. The sole apparent force in this contention lies in the fact that it tends to place those who differ in the good company of Sydney Smith's friend who "spoke disrespectfully of the equator."

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